

COLLAPSIBLE CHAIR WITH ADJUSTABLE BACKREST

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to a chair, such as a deck chair, and in particular to a collapsible chair having an adjustable backrest.

2. The Related Art

[0002] Chairs, such as deck chairs, that allow a person to sit and partially lie down on a backrest of the chair are known. Conventional deck chairs, although some featuring a folding or collapsible structure, have a fixed backrest that tilts at a fixed angle to allow a person to partially lie down. Such an angle is fixed and thus not adjustable. This may cause uncomfortable situations for different persons. In some designs of the deck chairs, the tilting angle of the backrest is too large to make a person comfortably lying thereon. It may sometimes cause troubles to the old to get up from the excessively tilting backrest or even fall down over the backside of the chair.

[0003] Deck chairs with adjustable backrest are also known. However, complicated adjusting mechanisms are often involved in such deck chairs. Not only is the adjustment of the backrest complicated and troublesome, but also manufacturing costs of the deck chairs are significantly increased.

[0004] Thus, it is desired to have a collapsible chair with an adjustable backrest that effectively eliminates the drawbacks encountered in the conventional designs of the collapsible chairs.

SUMMARY OF THE INVENTION

[0005] Therefore, a primary object of the present invention is to provide a collapsible chair having an adjustable backrest that allows for easy adjustment of tilting angle of the backrest.

[0006] Another object of the present invention is to provide a collapsible chair having an adjustable backrest that prevents over-tilting and thus causing falling of a person lying down on the backrest.

[0007] A further object of the present invention is to provide a collapsible chair with adjustable backrest that is simple in structure and low in costs.

[0008] Yet a further object of the present invention is to provide a collapsible chair that is selectively and movably mounted on a base to form a rocker chair.

[0009] To achieve the above objects, in accordance with the present invention, there is provided a chair comprising a support assembly comprised of a front leg set having two space front leg bars and a rear leg set having two space rear leg bars that are located between and pivoted to the front leg bars. A backrest has lower ends pivoted to the rear leg bars and is thus rotatable with respect to the support assembly to selectively change a tilting angle of the backrest with respect to the support assembly. A tubular slide is movably fit over a free end of each front leg bar and is pivoted to the backrest. The tubular slide has a fastening device to selectively secure the tubular slide with respect to the front leg bar thereby releasably securing the backrest with respect to the support assembly. The support assembly is selectively mounted on a base and is supported above the ground. Swings arms are rotatably mounted to both the base and the support assembly to allow for to and fro movement of the support assembly with respect to the base.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The present invention will be apparent to those skilled in the art by reading the following description of preferred embodiments thereof, with reference to the attached drawings, in which:

[0011] Figure 1 is a perspective view of a collapsible chair constructed in accordance with the present invention;

[0012] Figure 2 is a perspective view of the chair of the present invention mounted to a base to form a rocker chair;

[0013] Figure 3 is a perspective view of the chair with covering mounted thereon;

[0014] Figure 4 is a side elevational view of the collapsible chair of the present invention;

[0015] Figure 4A is an enlarged view of encircled portion 4A of Figure 4, but shown in an exploded form;

[0016] Figure 4B is a cross-sectional view taken along line 4B-4B of Figure 4A;

[0017] Figure 5 is a side elevational view showing a collapsing operation of the chair of the present invention; and

[0018] Figure 6 is a side elevational view of the chair in a collapsed condition.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] With reference to the drawings and in particular to Figures 1 and 4, a collapsible chair constructed in accordance with the present invention, generally designated with reference numeral 10, comprises a support assembly 12 and a backrest 14 movably mounted to the support assembly 12 whereby the backrest 14

selectively tilts with respect to the support assembly 12 at a tilting angle which is adjustable.

[0020] The support assembly 12 comprises a front leg set 16 and a rear leg set 18 pivoted to each other. The front leg set 16 comprises two front bars 20, 22 spaced from and substantially parallel to each other. The front bars 20, 22 are fixed together by front crossbars 24 extending therebetween. Although in the embodiment illustrated, two front crossbars 24 are used to fix the front bars 20, 22 together, other numbers of front crossbars may also be used. For example, the front bars 20, 22 can be fixed together by a single front crossbar.

[0021] The rear leg set 18 comprises two rear bars 26, 28 spaced from and substantially parallel to each other. The rear bars 26, 28 are fixed together by a rear crossbar 30 extending therebetween. Although in the embodiment illustrated, a single rear crossbar 30 is used to fix the rear bars 26, 28 together, other numbers of rear crossbars may also be used. For example, the rear bars 26, 28 are fixed together by two or more rear crossbars. The front and rear crossbars 24, 30 are of such lengths that the rear leg set 18 is received between the front bars 20, 22 of the front leg set 16 with the rear bars 26, 28 adjacent to the front bars 20, 22 whereby pivot pins 32, 34 extends through the rear bars 26, 28 and the associated front bars 20, 22 to pivot the rear leg set 18 to the front leg set 16.

[0022] Apparently, the lengths of the front crossbars 24 and the rear crossbar 30 can be selected so that the front leg set 16 is received between the rear bars 26, 28 and pivoted thereto.

[0023] Each of the front and rear bars 20, 22, 26, 28 has an end 36, 38, 40, 42 positionable on a fixture surface (not shown), such as the ground, for supporting the support assembly 12 on the fixture surface. In the embodiment illustrated, the end 36, 38, 40, 42 has an expanded portion for soundly supporting the chair 10. Preferably, the expanded portion is spherical, as illustrated in the drawings.

[0024] The backrest 14 comprises two back bars 44, 46 spaced from and substantially parallel to each other. The back bars 44, 46 are fixed together by back

crossbars 48, 49 extending therebetween. The back crossbars 48, 49 are so arranged that the back crossbars 48, 49 and the back bars 44, 47 form a rectangle with lower end sections 50, 52 of the back bars 44, 47 extending beyond the lower back crossbar 48. The back crossbars 48, 49 have a length substantially corresponding to the length of the rear crossbar 30 so that the lower end sections 50, 52 of the back bars 44, 46 are respectively in alignment with the rear bars 26, 28 of the rear leg set 18.

[0025] Also referring to Figures 4A and 4B, a joint member 54 connects the lower end section 50, 52 of each back bar 44, 46 of the backrest 14 to an associated rear bar 26, 28. The joint member 54 comprises two spaced lugs 55 partially receiving the rear bar 26, 28 therein and a bolt 56 extends through both the lugs 55 and the rear bar 26, 28 to pivotally attach the joint member 54 to the rear bar 26, 28. The joint member 54 comprises a cylinder 54A removably fit into the lower end section 50, 52 of the back bar 44, 46. In this respect, the back bar 44, 46 is preferably tubular and has a lower opening for receiving the cylinder 54A. A spring biased pin 54B sideways projects from the cylinder 54A for releasably engaging a hole 50A defined in the tubular wall of the back bar 44, 46 thereby releasably securing the backrest 14 to the rear leg set 18. The pivot joint formed by the bolt 56 between the backrest 14 and the rear leg set 18 allows the backrest 14 to selectively tilt or lean with respect to the support assembly 12 at a tilting angle that is adjustable through rotation of the backrest 14 with respect to the support assembly 12.

[0026] Each back bar 44, 46 has a telescopic construction comprising an inner tube 441, 461 telescopically received in an outer tube 442, 462. A pin (not labeled) is arranged in the inner tube 441, 461 and is resiliently biased to extend beyond the inner tube 441, 461 to engage holes 58 defined in the outer tube 442, 462 thereby selectively securing the position of the inner tube 441, 461 with respect to the outer tube 442, 462. This provides the backrest 14 with an adjustable size by means of the telescopic displacement of the inner tubes 441, 461 with respect to the outer tubes 442, 462, as indicated by arrow C of Figures 4 and 5.

[0027] Preferably, the upper back crossbar 49 is integrally formed with the inner tubes 441, 461 to form a U-shaped configuration, while the lower back crossbar 49 is mounted between the outer tubes 442, 462.

[0028] The front leg set 16 comprises a tubular slide 60 having an end fit over a free end section 62 (shown in phantom lines) of each front bar 20, 22. The tubular slide 60 telescopically receives the free end section 62 therein and movable along and with respect to the free end section 62 to change relative position therebetween. The tubular slide 60 is pivoted to the corresponding back bar 44, 46 of the backrest 14 for selectively imposing constraints to the rotation of the backrest 14 with respect to the support assembly 12. Fastening means 66 is provided between the tubular slide 60 and the free end section 62 for selectively securing the tubular slide 60 with respect to the end section 62 of the front bar 20, 22 thereby fixing the backrest 14 with respect to the support assembly 12.

[0029] In the embodiment illustrated, the fastening means 66 comprises a collar 68 mounted to the tubular slide 60, comprising deformable paws (not shown), which when actuated by an operation level 70, impose a sufficient friction force to the end section 62 thereby securing the tubular slide 60 with respect to the end section 62. The friction based fastening means is generally known to those having ordinary skills and thus no further details will be given herein. It is also noted that such a friction based fastening means can be replaced by other known fasteners, such as spring-biased pins.

[0030] Flexible connection means, such as a rope and a wire 72, is arranged inside the tubular slide 60 and has opposite ends (not labeled) attached to the tubular slide 60 and the end section 62 of the front bar 20, 22 respectively. The wire 72 has a length that is shorter than a maximum length of the end section 62 that can be received into the tubular slide 60 whereby the tubular slide 60 is prevented from sliding off the end section 62 of the front bar 20, 22 by the wire 72. Apparently, other means performing the same function of preventing the tubular slide 60 from sliding off the end section 62 can be adapted to replace the wire 72.

[0031] In the embodiment illustrated, the front and rear bars 20, 22, 26, 28 are of convex arc configurations. This allows for a comfortable and sound support to a person sitting thereon. The arc configuration of the front bars 20, 22 also allows for the formation of armrests by portions of the front bars 20, 22 between the backrest 14 and the pivot joints 32, 34 of the front bars 20, 22 with respect to the rear bars 26, 28.

[0032] Also referring to Figures 5 and 6, collapse of the chair 10 is illustrated. Collapse of the chair 10 is easily carried out by releasing the fastening means 66 to allow the tubular slides 60 to move to a furthest location from the end sections 62, as indicated by arrow **A** of Figure 5, which rotates the backrest 14 with respect to the support assembly 12 about pivot pins 56, as indicated by arrow **B** of Figure 6. The furthest location is determined by the length of the wire 72, which is such that the backrest 14 substantially overlies on the back leg set 18 and the front and back leg sets 16, 18 substantially coincident with each other as illustrated, thereby completing the collapse of the chair 10.

[0033] Also referring to Figure 3, a seat member 74 comprises a flexible member, such as a fabric made of synthetic or natural fibers or simply a thin plastic sheet, mounted between the rear bars 26, 28 between the lugs 54 to which the backrest 14 is pivoted and free ends 76, 78 of the rear bars 26, 28 for supporting a person thereon. If desired, the seat member 74 may comprise a cushion or a pad mounted on a rigid base (both not shown), which is in turn mounted to the rear bars 26, 28.

[0034] A back support member 80 comprises a flexible member, such as a fabric made of synthetic or natural fibers or simply a thin plastic sheet, mounted between the back bars 44, 46. Preferably, the back support member 80 is attached to the outer tubes 442, 462 to allow the movement of the inner tubes 441, 461 with respect to the support assembly 12. A head pillow 81 is attached to the upper back crossbar 49 and partially overlaps an upper end of the back support member 80 whereby the head pillow 81 is firmly supported between the crossbar 49 and the back support member 80. The overlapped portion of the head pillow 81 allows for displacement of the upper back crossbar 49 with respect to the backrest 14 without separating the head pillow 81 from the back support member 80.

[0035] Armrest pads 82 made of soft material surround the portions of the front bars 20, 22 that function as armrests. The soft pads 82 provide comfortable contact between the arms of a person that sits on the chair 10 and the armrests.

[0036] Also referring to Figure 2, the chair 10 of the present invention can be converted into a rocker chair 84 by mounting the chair 10 to a base 86. The base 86,

which is positioned on a fixture surface (not shown), such as the ground, is sized to be accommodated under the chair 10 and partially received between the front bars 20, 22 and the rear bars 26, 28 for supporting the chair 10 above the fixture surface with a suitable distance between the chair 10 and the fixture surface.

[0037] In the embodiment illustrated, the base 86 is made up of two inverted U-shaped bar members 88, 90 with crossbars 92 connected therebetween. Each U-shaped bar member 88, 90 has a top section 94, 96 extending substantially horizontally and two legs 94A, 96A depending from opposite ends of the top section 94, 96. An elongate bar 98, 100 is mounted to and extends between the front bar 20, 22 and the associated rear bar 26, 28 at a position below the corresponding top section 94, 96 of the base 86 and is substantially parallel to the top section 94, 96. Two swing arms 102 are connected between the elongate bar 98, 100 and the top section 94, 96 by having opposite ends (not labeled) rotatably mounted to the elongate bar 98, 100 and the top section 94, 96 by rotation joints 104. The swing arms 102 are substantially parallel whereby the swing arms 102, the top section 94, 96 and the elongate bar 98, 100 form a parallelogram, which together with the rotation joints 104 between the swing arms 102 and the top section 94, 96 and the elongate bar 98, 100, allows the chair 10 to move to and fro with respect to the base 86, functioning as a rocker chair.

[0038] Each leg 94A, 96A comprises a tubular section telescopically receiving an inner leg member 94B, 96B. The inner leg member 94B, 96B is movable with respect to the leg 94A, 96A at least between upper and lower positions where the chair 10 is raised to and lowered down to high and low positions with respect to for example the ground. Releasable fastening means, such as spring-biased pin and hole pair, is provided between the inner leg member 94B, 96B and the leg 94A, 96A for selectively securing the chair 10 at the high and low positions.

[0039] Although the present invention has been described with reference to the preferred embodiments thereof, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the present invention which is intended to be defined by the appended claims.